GOODRICH

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COPY

March 14, 2008

Ms. Virginia Darrell, P.E.
Point Source Unit Supervisor
Water Quality Program
Department of Ecology
4601 North Monroe
Spokane, WA 99205

Re: Agreed Order (AO) #4018, signed 1-12-07, Request for Variance (initially submitted 1-7-08)

Dear Ms. Darrell:

In accordance with the subject AO, Provision 3.2.6 a), and per discussions with Hazardous Waste & Toxic Reduction Personnel, Tom Cusack and Lisa Brown, please accept this letter as Goodrich Corporation's (Goodrich) request for a variance from classification as a solid waste for the liquid condensate described below. Goodrich understands that the Washington State Department of Ecology (Ecology) will evaluate this application and issue a public notice granting or denying the request. This submittal does not contain Confidential Business Information (CBI).

The basis for our request is found in **WAC 173-303-017(5)(b)(iii)** as follows:

(b) Standards and criteria for variances from classification as a solid waste.

(iii) The department may grant requests for a variance from classifying as a solid waste those materials that have been reclaimed but must be reclaimed further before recovery is completed if, after initial reclamation, the resulting material is commodity-like (even though it is not yet a commercial product and has to be reclaimed further). This determination will be based on the following factors:

(A) The degree of processing the material has undergone and the degree of further processing that is required;

The Goodrich Spokane facility operates six natural gas boilers which meet the definition of "Boiler" in WAC 173-303-40. Each boiler is rated at 27,600 pounds of steam per hour at 100% (33 million BTUs per hour). The boilers produce steam used during the Chemical Vapor Deposition (CVD) process to create a vacuum in the CVD furnaces for carbon brake manufacturing. The vacuum regulates the flow of gaseous materials to all of the brake forms being processed inside the CVD furnaces.

In creating the vacuum, the steam comes in direct contact with gas-phase organic byproducts inherent in the carbon brake manufacturing process and scrubber oil. When the steam is cooled (condensed), the resulting condensate contains hydrocarbons and water. Hydrocarbons in boiler feed water negatively affect boiler performance, making it necessary to process the condensate to remove the hydrocarbons prior to its reuse as feed water to the boilers.

The condensate is processed through oil/water separators and bag filtration units to remove the hydrocarbons. Each oil/water separator is connected to a condensate return tank and an oil collection tank. Hydrocarbons removed from the condensate are collected as used oil. The condensate collects in the condensate return tank and is processed through the bag filters and into the deaerators to be recycled through the boilers as feed water. Each deaerator services three boilers.

Boiler operators monitor the level of chemicals in the feed water and add chemicals as needed to maintain efficient boiler operation. Condensate reintroduced to the boilers carries residual chemicals that are not present in the fresh water. In addition, fresh water used as supplemental feed water for the boilers must be treated through water softeners prior to introduction to the deaerators.

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Goodrich believes that the liquid condensate generated in the Vacuum Steam Jet Condenser Units, Furnace Gas Recovery (FGR) System, and subsequently reclaimed through the Hotwell Tanks, Oil/Water Separators, Condensate Return Tanks and Bag Filter Unit, is not "solid waste" because the condensate is reclaimed, processed and reused on site, in substantially its original form, as feed water for the boilers to produce steam.

(B) The value of the material after it has been reclaimed;

The value of the condensate to Goodrich would be the cost of replacing condensate with fresh water that would have to be purchased from the City of Spokane. City water use is billed in "units." One unit is 100 cu. ft. or 748 gallons of water. Goodrich pays $1.37/unit of water. At current levels of production, the average condensate return flow is 130 gallons/minute or approximately 68,328,000 gallons/year (91,348 units/year). Direct cost to replace the condensate return flow with fresh water purchased from the City of Spokane would be:

91,348 units * $1.37/unit of water = **$125,146/yr.**

There is indirect value that is also significant as detailed below:

- Fresh city water is generally cooler than the condensate return (50°F compared to 85°F). Additional natural gas would be needed to convert this cooler water into steam.

Makeup water needed	68,328,000 gal water / yr
Density of water	8.34 lb / gal

68,328,000 gal water /yr * 8.34 lb/gal water, m = 569,855,520 lb water / yr

Heat capacity of water, C_p = 1 Btu / lb / °F

Est. condensate temperature	85 °F
Fresh water inlet temperature	50 °F
Temperature difference, ΔT =	35 °F

Added energy to heat makeup water ($Q=m*C_p*\Delta T$), Q = 19,944,943,200 Btu / yr

Natural gas (NG) energy unit	100,000 Btu / therm of NG
Energy to heat makeup water	199,449 therms / yr
Goodrich NG cost	$0.81 / therm
Cost to heat fresh makeup water	**$162,485/yr**

- Chemicals are introduced into the boilers to maintain efficient operation by reducing corrosion and minimizing scale. Boiler operators monitor the level of chemicals in the feed water and add more as needed. Condensate carries residual chemicals that are not present in city water. Increased use of city water would require additional water treatment thereby increasing chemical use and substantially raising operating costs. The following information was supplied by our NALCO boiler chemical sales and service representative. Using the assumptions stated above, introducing fresh water vs. condensate into the system would result in the following increased water softener regenerations (regen) and increased flow to the sewer:

Current softener throughput	45,000 gals/regen
Current salt use per regen	225 lbs/salt
Current salt cost	$0.113/lb
Current water use per regen	500 gals/regen

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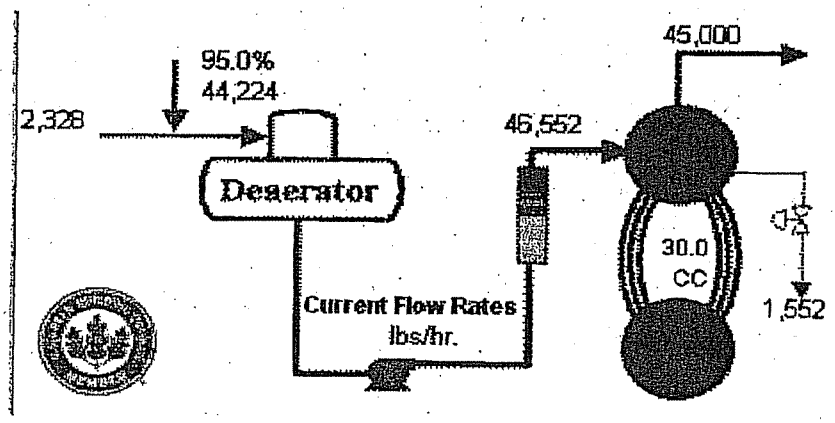
Sewer treatment fee	$1.90 /unit
Extra make up water needed	68,328,000 gals = 91,347.6 units
Extra Regenerations required	1,518 regens/year
Increased salt use	341,640 lbs/year
Increased salt cost	**$ 38,605.32/yr**
Increased water to drain	759,200 gals = 1,015 units
Increased sewer costs	**$1,928.75/yr**

- Blow down (discharge to the sewer) is triggered by the level of conductivity in the deaerators and boilers. As conductivity increases, the frequency and duration of blow down also increase, resulting in higher discharge to the sewer, more demand for fresh water as makeup water, more natural gas used to heat the water and higher chemical use to treat the fresh water. Reducing the condensate return also greatly impacts the boiler cycles. According to our NALCO boiler chemical sales and service representative, blow down from the boilers would increase from approximately 1,500 lbs/hr to 5,000 lbs/hr. as cycles decrease from 30 to 10. The following diagrams, provided by NALCO, show the operating scenario at current levels of production compared to operating without the condensate return flow to the deaerator.

Current Operating Scenario: 95% condensate return to the deaerator, 44,224 lbs/hour + 2,328 lbs/hr fresh water input to produce 46,552 lb/hour flow to the boiler resulting in an average 45,000 lb/hr steam flow and 1,552 lb/hour blowdown to the sewer.



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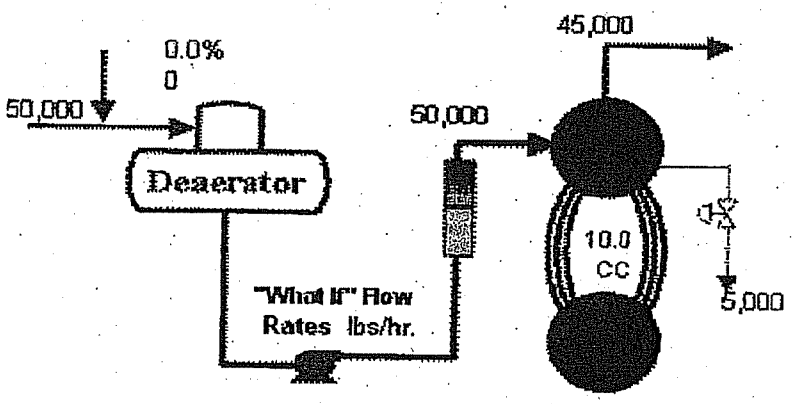
Operating Scenario without condensate loop: 0% condensate return to the deaerator, 50,000 lbs/hr fresh water input to produce 50,000 lb/hour flow to the boiler, resulting in 5,000 lb/hour blowdown to the sewer for the same average 45,000 lb/hr steam flow.



Current annual cost of water treatment chemicals is $38,585. Using a multiplier of 3.2 (1,552 gallons blowdown of treated water vs. 5,000 gallons blowdown of treated water), estimated chemical cost increase would be **$84,887/yr.**

Table 1: Summary of Increased Annual Costs Without Condensate Return Loop	
Process	**Cost (US$)**
Cost of makeup water purchased from the City	$125,146
Cost to heat makeup water	$162,485
Cost of additional discharge to POTW	$173,588
Cost of increased chemical use for water softeners	$ 38,605
Cost of increased blow down discharged to POTW	$ 1,929
Cost of additional water treatment chemicals for boilers	$ 84,887
Total Annual Cost Increase without Condensate Return Loop	**$586,640**

Please note that these figures reflect the current average production rates rather than full capacity production rates.

(C) The degree to which the reclaimed material is like an analogous raw material;

The "analogous raw material" in this case is fresh water that would be purchased from the City of Spokane. The treated condensate replaces gallon-for-gallon fresh water that would have to be purchased from another source. Without the condensate recycling loop, depending on production rates, 3 million to 7 million gallons of city water would be needed per month to replace the condensate.

(D) The extent to which an end market for the reclaimed material is guaranteed;

For the condensate, the "end market" in this case is the Goodrich Spokane facility. At an estimated annual cost savings of $586,640, recycling condensate is desirable. Clearly, the cost avoidance guarantees the end market for the reclaimed condensate.

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Hydrocarbons scrubbed from the condensate by the oil-water separators are managed as used oil and shipped off-site by tanker trucks to be re-refined. Since August, 2007, more than 18,000 gallons of used oil have been sent for re-refining. Used oil leaving the facility is further processed by an outside vendor and transformed into new fuels, lube stocks, or other petroleum products. With the price of crude oil hovering between $90 and $100/barrel, there is an active and growing market for products made by re-refining. Therefore, the market for hydrocarbons removed from the condensate stream is also guaranteed.

(E) The extent to which the reclaimed material is handled to minimize loss;

95% of the condensate generated is returned to the boilers as makeup water. The system is regularly inspected for proper operation and to ensure that there are no losses of condensate or used oil to the environment.

(F) Other relevant factors.

Discharge of waste water to the City of Spokane Wastewater Treatment Plant (Publicly Owned Treatment Works, POTW) is in accordance with State Waste Discharge Permit No. ST-8068, issued by Ecology. The POTW further treats waste water prior to release to the Spokane River. A Supplemental Environmental Project (SEP) that would polish Goodrich's process waste water discharge prior to co-mingling with the sanitary sewer system has been proposed to Ecology

Please call me, 509-744-6035, if you have any questions regarding this application for a variance.

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Glenda Empsall
EH&S Coordinator

Cc: Ms. Lisa Brown, P.E., Hazardous Waste & Toxics Reduction Program
Department of Ecology – Eastern Regional Office